



## Carbon Cycle Activity

*How does carbon dioxide cycle through the ocean, land, and atmosphere?*

### Key Concept

Carbon dioxide moves through Earth's systems as part of the global carbon cycle.

### What You Should Know

- Carbon dioxide is naturally exchanged between the atmosphere and life on land and in the oceans through the processes of photosynthesis and respiration.
- In the carbon cycle, “sinks” are reservoirs that store carbon dioxide.
- In the carbon cycle, “sources” release carbon dioxide to the atmosphere.
- Over long periods of time, the flow of carbon dioxide into and out of the atmosphere naturally balances. (Over time, sources and sinks naturally balance.)
- Since the Industrial Revolution and the increased burning of fossil fuels (coal, oil and natural gas), humans are releasing so much carbon dioxide so fast that it is accumulating in the atmosphere. (Sources are overwhelming sinks.)

### Materials (per student group)

- 1 set of carbon cards (21) [Note: You can print cards from the file, “CarbonCards.pdf”]

### Investigation A

Place each card image-side up on a tabletop or desk. Ask students to sort the cards into two categories: images of organisms, activities, or processes that release carbon dioxide (sources) vs. those that absorb carbon dioxide (sinks).

If students are unsure about some cards, have them set those aside.

### Discussion

- 1) Read the backs of the cards in the “uncertain” pile. After discussing, put these in the correct category.
- 2) Count the cards in each group. Which has more, sources or sinks? (sources)
- 3) Distinguish between natural processes and human activities depicted on the cards.
  - a. For the natural processes, which ones **release** carbon dioxide? Which ones **absorb** carbon dioxide? What absorbs about half of the carbon

dioxide being generated by humans burning fossil fuels for transportation and electricity? (the ocean)

- b. For human (anthropogenic) sources, which ones involve burning of fossil fuels?

### **Investigation B**

Use only human-based source cards. Ask students to sort cards into human-use categories such as manufacturing of products, transportation, electricity, and other categories by using both the image and the text. Ask students to select three cards representing activities that are part of their daily lives.

### **Discussion**

- 1) Ask students to describe their three cards and how each activity is incorporated into their day.
- 2) Ask students to brainstorm ways they might reduce their emissions of carbon dioxide.

### **Investigation C**

Using a poster or large image of the carbon cycle, place the cards in the appropriate places in the cycle, taking care to match the processes (e.g., respiration, photosynthesis, etc.) shown in the cycle.

### **Investigation D**

Thinking about the processes represented by the images (e.g., photosynthesis, decay, etc.), sort the cards into slow-acting or infrequent processes vs. fast-acting or frequent processes.

### **Discussion**

- 1) If sources release carbon dioxide faster than natural processes can handle it, what would you expect to happen in the system?